WHAT IS CLAIMED IS:

1. An oligomeric para-phenylene compound having the formula:

$$R^1\text{-}(Ar^i)_n\text{-}R^2$$

wherein

the subscript n is an integer of from 5 to 15;

the superscript i is an integer of from 1 to n and denotes the position downstream from R^1;

each Ar is a substituted or unsubstituted aryl group;

R^1 and R^2 are each substituents that increase the solubility of the para-phenylene compound in nonpolar organic solvents relative to the solubility of the corresponding compound wherein R^1 and R^2 are hydrogen;

with the proviso that the Ar^i groups are linked together in a 1,4-paraphenylene manner.

2. A compound of claim 1, wherein n is an integer of from 5 to 9.

3. A compound of claim 1, wherein said Ar^i groups are independently selected from unsubstituted phenylene and phenylene having from 1 to 4 fluoro substituents.

4. A compound of claim 1, wherein said Ar^i groups are independently selected from unsubstituted phenylene, phenylene having from 1 to 4 fluoro substituents; and substituted or unsubstituted fused polycyclic aryl with the proviso that any fused polycyclic aryl groups are linked in the compound in a manner that maintains a coplanar orientation relative to the adjacent Ar^i groups.

5. A compound of claim 4, wherein said fused polycyclic aryl groups are selected from the group consisting of 2,6-naphthylene, 2,7-phenanthrylene, 2,6-anthrylene, and 2,6-carbazolylidene.

6. A compound of claim 1, wherein the subscript n is 7 and Ar^3 and Ar^5 are substituted or unsubstituted 2,6-naphthylene.

7. A compound of claim 1, wherein the subscript n is 7 and Ar^4 bears two substituted or unsubstituted phenyl ring substituents other than the remaining Ar^i groups.

1   **8.**   A compound of claim **1**, wherein R^1 and R^2 are each independently

2   substituents having the formula:
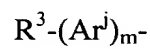
3                    $R^3\text{-}(Ar^j)_m\text{-}$
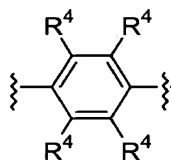
4   wherein

5   the subscript m is an integer of from 1 to 5;

6   each Ar^j is selected from the group consisting of
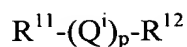
7   a) a 1,4-phenylene group having the formula:

8

9   wherein each R^4 is a member independently selected from the group consisting of

10   H, substituted or unsubstituted $(C_1\text{-}C_{12})$alkyl, substituted or unsubstituted $(C_1\text{-}$

11          $C_{12})$alkoxy, substituted or unsubstituted $(C_1\text{-}C_{12})$alkylamino, substituted or

12   unsubstituted $(C_1\text{-}C_{12})$alkylthio, substituted or unsubstituted di$(C_1\text{-}$

13          $C_{12})$alkylamino, substituted or unsubstituted arylamino, substituted or

14   unsubstituted diarylamino and halogen, with the proviso that at least two of

15   the four R^4 substituents are independently selected from substituted or

16   unsubstituted $(C_1\text{-}C_{12})$alkyl and substituted or unsubstituted $(C_1\text{-}C_{12})$alkoxy,

17   and

18   b) an aryl biradical selected from the group consisting of 1,4-naphthylene, 1,4-

19   anthrylene, 9,10-anthrylene, 5,6,7,8-tetrahydronaphth-1,4-ylene, 9,9',10,10'-

20   tetra$(C_1\text{-}C_{12})$alkyl-9,10-dihydroanthr-1,4-ylene, 9,9'10,10'-tetraaryl-9,10-

21   dihydroanthr-1,4-ylene, 9,9'10,10'-tetra$(C_1\text{-}C_{12})$alkyl-9,10-dihydroanthr-2,6-

22   ylene, 9,9'10,10'-tetraaryl-9,10-dihydroanthr-1,4-ylene; and

23   R^3 is selected from the group consisting of H, substituted or unsubstituted $(C_1\text{-}$

24          $C_{12})$alkyl, substituted or unsubstituted $(C_1\text{-}C_{12})$alkoxy, substituted or

25   unsubstituted $(C_1\text{-}C_{12})$alkylamino, substituted or unsubstituted $(C_1\text{-}$

26          $C_{12})$alkylthio, substituted or unsubstituted di$(C_1\text{-}C_{12})$alkylamino, substituted or

27   unsubstituted arylamino, substituted or unsubstituted diarylamino and halogen.

1   **9.**   A compound of claim **8**, wherein m is an integer of from 1 to 3.

1   **10.**   A polymer of the formula:

2 $$R^{11}\text{-}(Q^i)_p\text{-}R^{12}$$
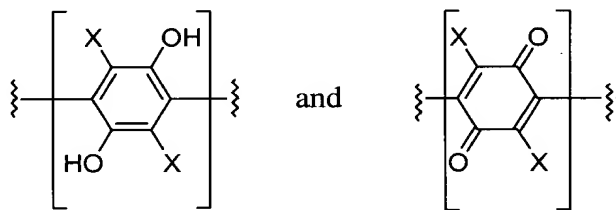
3 wherein

4   each R^{11} and R^{12} is independently selected from the group consisting of H,

5   substituted or unsubstituted $(C_1\text{-}C_{12})$alkyl, substituted or unsubstituted $(C_1\text{-}$

6         $C_{12})$alkoxy, substituted or unsubstituted $(C_1\text{-}C_{12})$alkylamino, substituted or

7   unsubstituted $(C_1\text{-}C_{12})$alkylthio, substituted or unsubstituted di$(C_1\text{-}$

8         $C_{12})$alkylamino, substituted or unsubstituted arylamino, substituted or

9   unsubstituted diarylamino and halogen;

10   the subscript p is an integer of from 5 to 200;

11   the superscript i is an integer of from 1 to p and indicates the position downstream

12   from R^1 of each Q;

13   each Q^i is a benzoquinone or hydroquinone subunit selected from the formulae:

and

14

15 wherein

16   each X is independently selected from the group consisting of H, substituted or

17   unsubstituted $(C_1\text{-}C_{12})$alkyl, substituted or unsubstituted $(C_1\text{-}C_{12})$alkoxy,

18   substituted or unsubstituted $(C_1\text{-}C_{12})$alkylamino, substituted or

19   unsubstituted $(C_1\text{-}C_{12})$alkylthio, substituted or unsubstituted di$(C_1\text{-}$

20         $C_{12})$alkylamino, substituted or unsubstituted arylamino, substituted or

21   unsubstituted diarylamino and halogen.

1   **11.**   A polymer of claim **10**, wherein said hydroquinone and benzoquinone

2 subunits are present in about a 50:50 ratio.

1   **12.**   A polymer of claim **10**, wherein said hydroquinone and benzoquinone

2 subunits alternate in said polymer so that no two hydroquinone subunits are adjacent and no

3 two benzoquinone subunits are adjacent.

1   **13.**   A polymer of claim **10**, wherein two adjacent hydroquinone subunits

2 alternate with one benzoquinone subunit.

1   **14.** A polymer of claim **10**, wherein two adjacent benzoquinone subunits
2   alternate with one hydroquinone subunit.
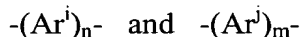
1   **15.** A block copolymer having the formula:
2   $$R^{21}\text{-}(Q^j)_k\text{-}R^{22}$$
3   wherein
4   each R^{21} and R^{22} is independently selected from the group consisting of H,
5   substituted or unsubstituted $(C_1\text{-}C_{12})$alkyl, substituted or unsubstituted $(C_1\text{-}$
6       $C_{12})$alkoxy, substituted or unsubstituted $(C_1\text{-}C_{12})$alkylamino, substituted or
7   unsubstituted $(C_1\text{-}C_{12})$alkylthio, substituted or unsubstituted di$(C_1\text{-}$
8       $C_{12})$alkylamino, substituted or unsubstituted arylamino, substituted or
9   ~~unsubstituted diarylamino and halogen;~~
10 the subscript k is an integer of from 2 to 20;
11 the superscript j is an integer of from 1 to k and indicates the position downstream
12   from R^{21} of each Q;
13 each Q^j is a para-phenylene block subunit or a solubility-enhancing subunit, said
14   subunits selected from the formulae:
15      $$\text{-}(Ar^i)_n\text{-} \quad \text{and} \quad \text{-}(Ar^j)_m\text{-}$$
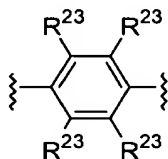16 wherein
17   the subscript n is an integer of from 5 to 15;
18   the subscript m is an integer of from 1 to 5:
19 each Ar^i is a substituted or unsubstituted aryl group linked in a manner that
20   maintains a coplanar orientation relative to adjacent Ar^i groups;
21 each Ar^j is selected from the group consisting of
22 a) a 1,4-phenylene group having the formula:

23
24 wherein each R^{23} is a member independently selected from the group consisting of
25   H, substituted or unsubstituted $(C_1\text{-}C_{12})$alkyl, substituted or unsubstituted $(C_1\text{-}$
26      $C_{12})$alkoxy, substituted or unsubstituted $(C_1\text{-}C_{12})$alkylamino, substituted or
27   unsubstituted $(C_1\text{-}C_{12})$alkylthio, substituted or unsubstituted di$(C_1\text{-}$
28      $C_{12})$alkylamino, substituted or unsubstituted arylamino, substituted or

29   unsubstituted diarylamino and halogen, with the proviso that at least two of

30   the four R^{23} substituents are independently selected from substituted or

31   unsubstituted $(C_1\text{-}C_{12})$alkyl and substituted or unsubstituted $(C_1\text{-}C_{12})$alkoxy,

32   and

33   b)   an aryl biradical selected from the group consisting of 1,4-naphthylene, 1,4-

34   anthrylene, 9,10-anthrylene, 5,6,7,8-tetrahydronaphth-1,4-ylene,

35   9,9',10,10'-tetra$(C_1\text{-}C_{12})$alkyl-9,10-dihydroanthr-1,4-ylene, 9,9'10,10'-

36   tetraaryl-9,10-dihydroanthr-1,4-ylene, 9,9'10,10'-tetra$(C_1\text{-}C_{12})$alkyl-9,10-

37   dihydroanthr-2,6-ylene, 9,9'10,10'-tetraaryl-9,10-dihydroanthr-1,4-ylene.

1   **16.**   A block copolymer of claim **15**, wherein Q^1, Q^3 and Q^5 are block para-

2 phenylene subunits and Q^2, Q^4 and Q^6 are solubility enhancing subunits.

1   **17.**   A block copolymer of claim **15**, wherein Q^1, Q^3, Q^5 and Q^7 are

2 solubility enhancing subunits and Q^2, Q^4 and Q^6 are block para-phenylene subunits.

1   **18.**   A block copolymer of claim **15**, wherein each Ar^i is selected from the

2 group consisting of unsubstituted 1,4-phenylene and fluoro-substituted 1,4-phenylene .

1   **19.**   A branched polymeric aromatic compound having the formula:

$$R-(Ar^i)_n \diagdown \quad \diagup (Ar^j)_n - R$$
$$R-(Ar^i)_n \diagup \qquad \diagdown (Ar^j)_{\overline{n}} - R$$
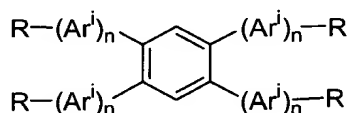
3 wherein

4   each R is a member selected from the group consisting of substituted or unsubstituted

5           $(C_1\text{-}C_{12})$alkyl, substituted or unsubstituted $(C_1\text{-}C_{12})$alkoxy, phenyl and

6   halogen;

7   the subscript n is an integer of from 3 to 8;

8   Ar is a substituted or unsubstituted aryl group and i is an integer denoting its position

9   away from the central tetrasubstituted phenyl ring, and each Ar^i can be the

10   same or different from Ar^i at any other position;

11   with the provisos that the Ar^i groups are linked together in a 1,4-paraphenylene

12   manner.

1   **20.**   A branched polymeric aromatic compound of claim **19**, wherein the

2 subscript n is 3; each Ar^1 and each Ar^3 is 1,4-phenylene; and each Ar^2 is a substituted or

3 unsubstituted 1,4-phenylene.

1   **21.**   A method of preparing a polymeric OLED material on a solid support,

2 said method comprising:

3   (a) contacting a solid support-bound aryl diazonium salt with 3,6-

4 dichloroquinone under conditions sufficient to form a solid support-bound aryl quinone

5 derivative; and

6   (b) contacting said solid support-bound aryl quinone derivative with a

7 diazonium compound having the formula:

8
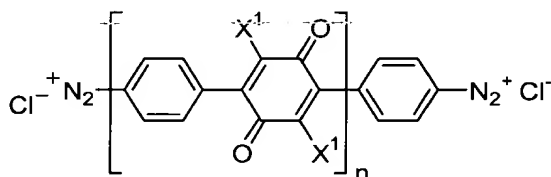
9 wherein each X^1 is a blocking group and the subscript n is an integer of from 0 to 4;

10   under conditions sufficient to form an intermediate poly OLED material;

11   (c) repeating steps (a) and (b) from 2 to 70 times; and

12   (d) terminating the polymeric OLED material by contacting the product of

13 step (c) with a terminating diazonium compound having the formula:

14
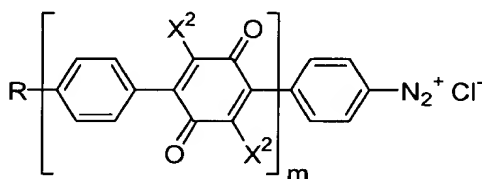
15   wherein

16   each X^2 is a blocking group,

17   R is a member selected from the group consisting of H, substituted or unsubstituted

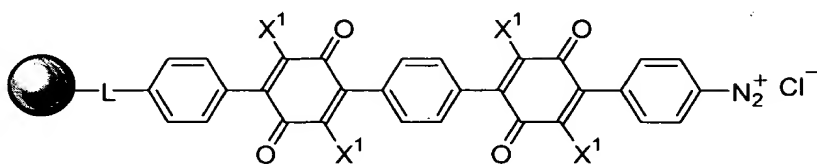18 (C_1-C_{12})alkyl, substituted or unsubstituted (C_1-C_{12})alkoxy, substituted or

19   unsubstituted (C_1-C_{12})alkylamino, substituted or unsubstituted $(C_1-$

20         $C_{12})$alkylthio, substituted or unsubstituted di(C_1-C_{12})alkylamino, substituted or

21   unsubstituted arylamino and substituted or unsubstituted diarylamino; and

22   m is an integer of from 0 to 3.

1   **22.** A method in accordance with claim **21**, wherein an intermediate poly

2   OLED material is produced having the formula:

3

4   wherein

5   L is a linking group;

6   the shaded sphere is a solid support; and

7   X^1 is a member selected from the group consisting of halogen, substituted or

8   unsubstituted alkyl, substituted or unsubstituted alkoxy, substituted or

9   unsubstituted alkylamino, substituted or unsubstituted alkylthio, and

10   substituted or unsubstituted dialkylamino.

1   **23.** A method in accordance with claim **21**, wherein said solid support is

2   selected from the group consisting of glass, tin oxide, indium oxide, and mixtures thereof.

1   **24.** A solid support-bound poly OLED material formed by the method of

2   claim **21**.

1   **25.** A polyfurano ladder oligomer having the formula:
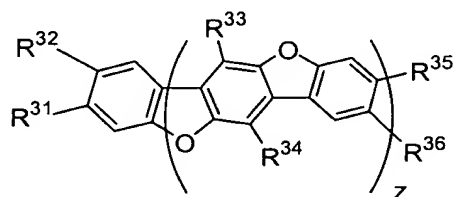
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3   wherein

4   the subscript z is an integer of from 2 to 7;

5   each of R^{31}, R^{32}, R^{33}, R^{34}, R^{35}, R^{36} is independently selected from the group consisting

6   of H, substituted or unsubstituted (C_1-C_{12})alkyl, substituted or unsubstituted

7   (C_1-C_{12})alkoxy and halogen.

1   **26.** A polyfurano ladder oligomer of claim **25**, wherein R^{32} and R^{35} are

2   each H.

1   **27.**   A polyfurano ladder oligomer of claim **25**, wherein z is an integer of

2 from 2 to 4; and R^{32} and R^{35} are each H.

1   **28.**   A method of forming a light emitting polymer, said method comprising

2 exposing an oligomeric para-phenylene compound of claim 1 having attached acrylate ester

3 groups to sufficient ultraviolet light to form a light emitting polymer comprising a plurality of

4 said oligomeric para-phenylene compound covalently attached to each other via ester and

5 ether linkages.

1   **29.**   A method of forming a light emitting polymer, said method comprising

2 exposing a polyfurano ladder oligomer of claim **25** having attached acrylate ester groups to

3 sufficient ultraviolet light to form a light emitting polymer comprising a plurality of said

4 polyfurano ladder oligomers covalently attached to each other via ester and ether linkages